THE *Beiblätter* to part 4 contains papers on the necessity of introducing certain modifications into the study of mechanics, and eliminating diverse problems from them, by Yvon Villarceau.—On the influence of temperature on manifestations of molecular energy, by A. Millar.—On the inner pressure and energy of superheated vapours, by G. Schmidt.

Journal de Physique Théorique et Appliquée, April, 1883.—Methods for determining the ohm, by Marcel Brillouin.—On the solidification of phosphorus and other substances in superfusion, by M. D. Gernez.—On the theory of colourless curves in double refractive crystals, by J. Macé de Lépinay.—A new hygrometer condensing internally, described and figured by A. Crova.—A new electrocapillary translator, described and figured by E. Debrun.—On the reading of a system of two electrodynamic machines, by A. Potier.

Revue Internationale des Sciences, February, 1883, contains articles:—On the contagiousness of tubercle.—On the Khouds, by Élie Reclus.—On the dangerous properties of finely-divided coal-dust, by Prof. Abel.—On the adulteration of food in Paris, by M. Egasse.—Medical anthropometry from the point of view of aptitude for military service, by M. Jansen.—Proceedings of the Academy of Sciences, Paris.

Journal of the Asiatic Society of Bengal, Vol. li. Part 11, No. 4, 1882, contains:—On a new species of Hipparchia from the North-West Himalayas, by Major G F. L. Marshall.—Notes and drawings of the animals of various Indian land mollusca, by Lieut.-Col. H. H. Godwin-Austin (Pl. 5).—Some further results of sun-thermometer observations, with reference to atmospheric absorption and the supposed variation of solar heat, by H. F. Blanford.

THE *Archives des Sciences Physique et Naturelles* for March contains papers by M. Schneebeli, on the determination of the absolute capacity of some condensers in electromagnetic measurement; by Raoul Gautier, on the great comet of September, 1882; by Dr. Julius Maurer, on the theory of the atmospheric absorption of solar radiation.—M. Casimir de Candolle has an interesting biographical notice of the eminent naturalist Emile Plantamour.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, April 19.—"On the Limiting Thickness of Liquid Films." By A. W. Reinold, M.A., Professor of Physics in the Royal Naval College, Greenwich, and A. W. Rücker, M.A., Professor of Physics in the Yorkshire College, Leeds.

The previous investigations of the authors have shown that the specific electrical resistance of a soap film thicker than 374×10^{-6} mm. is independent of the thickness, and that the composition of films formed of M. Plateau's "liquide glycérique" may be largely altered by the absorption or evaporation of aqueous vapour which attends even slight changes in the temperature or hygrometric state of the air (*Phil. Trans.* Part II. 1881, p. 447).

In the present paper they describe a modified form of the apparatus which they previously employed. The glass case in which the films are produced is surrounded by water, and additional precautions are adopted for maintaining the aqueous vapour within it at the tension proper to the liquid of which the films are formed. These changes have entailed considerable alterations in details, but the main features of the apparatus remain unaltered. The new form, however, possesses the important advantage that the temperature and hygrometric state of the air in contact with the films can be kept perfectly constant during the progress of the experiments. With this apparatus a number of measures have been made of the electrical resistance of films which have thinned sufficiently to show the black of the first order of Newton's rings. To deduce the thickness from the resistance, it is necessary to assume that the specific resistance of the films is the same as that of the liquid in mass. The authors' previous experiments do not enable them to assert the truth of this assumption for such thin films, and it was therefore important to ascertain by an independent method whether it might be taken as approximately true.

For this purpose between fifty and sixty plane films were formed in a glass tube 400 mm. long and 18 mm. in internal diameter. The tube was closed by pieces of plate glass and placed in the path of one of the interfering rays in a Jamin's "interferential refractometer." When the films had become black, a known number were broken by bringing an electromagnet near to the tube and thus moving some sewing needles which had been inclosed along with the films. The mean thickness of the films was deduced from the displacement of the interference "fringes" caused by their rupture.

Two liquids were observed, viz. M. Plateau's "liquide glycérique," and a soap solution containing no glycerine. The following are the means of the various groups of observations:—

Liquid.	Method.	Mean thickness in terms of 10^{-6} mm.
"Liquide glycérique" ...	Electrical... ...	11·9
	Optical	10·7
Soap solution	Electrical... ...	11·7
	Optical	12·1

The agreement between these numbers is sufficiently close to make the fact that they are approximately correct unquestionable, and to prove that the mean thickness of a black film is nearly the same for both liquids.

The electrical observations afford a means of comparing the thicknesses of different black films and observing whether or not the thickness of the black portion of any particular film alters as its area increases. The results obtained in the paper and in a previous preliminary investigation on the same subject (*Proc. Roy. Soc.*, 1877, No. 182, p. 334) are summed up by the authors as follows:—

(1.) Persistent soap films which thin sufficiently to exhibit the black of the first order of Newton's rings invariably display an apparent discontinuity in their thickness at the boundary of the black and coloured portions.

(2.) The whole of the black region, at the time of or very soon after its formation, is of uniform thickness.

(3.) This thickness remains unaltered in any film, whether the coloured parts of the film are thinning or thickening, increasing or diminishing in extent.

(4.) It is different for different films, but no connection has been traced between its magnitude and the time which elapses between the first formation of the film and the first appearance of the black, or between either of these and the time of observation.

(5.) The mean values of this thickness are the same to within a fraction of a millionth of a millimetre, whether the films are plane or cylindrical, in contact with metal or with glass, formed of soap solution alone, or with the addition of more than two-fifths of its volume of glycerine.

(6.) Two totally independent methods of measuring the thickness of the black portions of the films give completely concordant results.

(7.) The mean value of the thickness calculated by giving equal weight to the results of the electrical and optical experiments is $11{\cdot}6 \times 10^{-6}$ mm. The extreme values formed were $7{\cdot}2 \times 10^{-6}$ and $14{\cdot}5 \times 10^{-6}$ mm.

The smaller of these quantities is therefore a limiting thickness to which a soap film in air saturated with the vapour of the liquid from which it is formed rarely attains, and below which none of the films observed by us have thinned.

Linnean Society, May 24.—Anniversary Meeting.—Sir John Lubbock, Bart., president, in the chair.—Mr. R. McLachlan read for the Audit Committee the statement of receipts and payments for the year; 750*l.* had been invested, and a balance at banker's (April 30) remained of 514*l.* 8*s.* 7*d.*—The Secretary (Mr. B. D. Jackson) read his annual Report. Since the last anniversary 11 Fellows and 1 foreign member had died and 11 withdrawn, while 54 new Fellows had been elected. Between purchase, exchange, and donations, 407 volumes and 442 separate parts had been added to the library.—Mr. G. J. Romanes, on behalf of the subscribers, formally handed over the portrait of Charles Darwin, painted by Mr. J. Collier, its exhibition at the Royal Academy last year having then prevented its presentation.—A bust of the late Prof. Louis Agassiz by the American sculptor, Mr. Hiram Power, was handed over by Prof. Allman to the Society as a present from the sculptor's son, Mr. H. Power of Florence.—An engraving from Gainsborough's painting of the old English naturalist, Mr. Thomas Pennant, was presented by Mr. Howard Saunders in the name of Mrs. Alston, as a bequest from her son, the Society's late secretary, Mr. E. R. Alston.—The President then delivered his anniversary address, commenting generally on the events of the past year, with special reference to their bearing upon the Society; in congratulating

the Society on its annual balance-sheet, he reminded the Fellows that, besides investments, the property of the Society might be valued at 25,000*l.*, or a total of 30,000*l.*; he alluded to colonial Fellows and the good work they are doing, incidentally referring to the British Association meeting in Canada in 1884. Reference was also made to the progress of rearrangement of the Biological Collections in the Natural History Museum at South Kensington; this was followed by reports on the various botanical and zoological publications issued at home and abroad during the last twelvemonth. Remarks were made on the stock of the Society's Journals and Transactions, also on the purchase of a portrait of Jacob Bobart (1598–1679), and the President himself presented a valuable portrait of Linnæus painted from life, by the Swedish Magnus Hollman.—A resolution was unanimously accorded by the Society, at the instance of the Chair, to Mr. G. Bentham and Sir J. D. Hooker on the completion of their great work, the "Genera Plantarum."—The scrutineers having examined the ballot, then reported that Mr. Thomas Christy, Mr. H. E. Dresser, Mr. G. Murray, Mr. H. Saunders, and Mr. H. T. Stainton had been elected into the Council in the room of Mr. H. W. Bates, Mr. G. Busk, Mr. C. B. Clarke, Sir John Kirk, and Mr. R. McLachlan, who retired; and for officers, Sir J. Lubbock as president, Mr. Frank Crisp as treasurer, and Mr. B. Daydon Jackson and Mr. G. J. Romanes as secretaries.

Physical Society, May 26.—Prof. Clifton in the chair.—Mr. G. Griffith read a paper on the graphical representation of musical intervals, in which he gave an account of previous attempts to represent musical intervals in a graphical manner, and exhibited an enlargement of a diagram published by Dr. Pole in Sir F. Ouseley's "Treatise on Harmony." In this diagram the musical intervals contained in one octave are represented by the differences between the logarithms of the vibration-numbers forming them. Mr. Griffith proposes to apply this principle to the whole musical scale. Retaining the lines used in ordinary music he inserts a faint line between these at unequal distances to represent the tones and semitones. Several diagrams were exhibited, in which the principle was applied to the representation of intervals to the sequence of the keys in the major diatomic scale, and to actual music. Mr. W. G. Blakely and Dr. Coffin considered that it would be a great help to students to have the method proposed. Mr. Blakely considered that it combined the advantages of the tonic solfa and ordinary notations. Dr. Coffin thought that it might become generally used.—A paper by Dr. J. Fleming on a phenomenon of molecular radiation in incandescent lamps. When the carbon filament in an Edison lamp volatilises, the vapour is condensed on the glass in a cloud. When the copper electrode is volatilised, the copper is likewise deposited, but there is a bare space or line left on the glass in the plane of the filament, forming as it were a shadow of the filament. Dr. Fleming explains this on the supposition that the copper particles are thrown off in straight lines, as in a Crooke's vacuum. This shadow is not noticed in the carbon deposits. Dr. Fleming also remarks that the colour of a thin copper couch is the same as a thin layer of gold in transmitted light.—Mr. W. Baily read a paper on an illustration on the crossing of rays. He took the case of three rays of homogeneous light of the same intensity, and parallel to one plane, and polarised so that the vibrations were also parallel to the plane, and he exhibited and explained diagrams showing the motion which would occur under the circumstances.—Prof. F. Guthrie exhibited one of Chladin's plates bearing a striking re-emblance to one of these figures. Mr. Baily thought the analogy might be a real one.—Prof. Clifton described an improvement which he had made in the glass insulating stem he had exhibited to the Society on a former occasion. This stem had a glass cup encircling it, and of a piece with the stem. Sulphuric acid was put into the cup. The new pattern had a hole formed into the bottom of the cup, and the upper part of the stem fitted into this hole like a stopper. It could thus be removed at will and the acid renewed. Prof. Ayrton stated that he had used a similar arrangement for nearly two years, a narrow necked glass bottle taking the place of the cup.—[In the report of the Physical Society for April 28 (p. 47), Mr. H. R. Droop's name was written *Troop*.]

Entomological Society, May 2.—J. W. Dunning, M.A., F.L.S., &c., president, in the chair.—The President said: "You scarcely need to be reminded that we this day complete the fiftieth year of our existence. It was on May 3, 1833, that nine gentlemen—Messrs. Children, J. E. Gray, G. R. Gray, Hope, Horsfield, Rudd, Stephens, Vigors, and Yarrell—met and resolved to found the Entomological Society of London. No time was lost; for on the 22nd of the same month the first general meeting was held at the Thatched House Tavern, the Rev. Wm. Kirby was chosen Honorary President, 103 Members were enrolled, and a Council of thirteen were chosen to complete the organisation of the Society and prepare rules for its government. Rooms were taken at No. 17, Old Bond Street, and on November 4, 1833, under the presidency of Mr. Children, the then Secretary of the Royal Society, a code of by laws was adopted and our first scientific meeting was held. Of the original Members six, and six only, still survive—Prof. C. C. Babington, the Rev. Leonard Jenyns (now Blomefield), Sir Sidney S. Saunders, Mr. W. B. Spence, Mr. G. R. Waterhouse, and Prof. Westwood. Of these Mr. Waterhouse has the additional distinction of having been one of the original Council, and the first Curator of the Society. Our meetings continued to be held at 17, Old Bond Street, from 1833 until 1852, when we removed to No. 12, Bedford Row; during nine sessions commencing in 1866, by the kindness of the Linnean Society, we assembled in Burlington House, but our library remained in Bedford Row. In 1875 the library and place of meeting were again united in this house; and though the building operations now in progress have prevented us from indulging in any celebration of our jubilee, we shall soon be in the enjoyment of improved accommodation, and I hope it may be long before the Society has again to change its quarters. At the present moment we have 33 Subscribers and 205 Ordinary Members, making a total of 238 contributing Members. Three years ago I ventured to express from this chair a hope that we might be able to publish a jubilee list of not less than 300 Members. It is not yet too late. And I appeal to each and all of you, gentlemen, to be active in striving to attain this object. 'The Entomological Society of London is instituted for the improvement and diffusion of entomological science.' From first to last this has been our only object. To bring fellow-workers into friendly communication and facilitate the interchange of ideas, to extract the hidden knowledge of secluded students, to provide a library for consultation, to encourage observation and experiment, and to publish the results for the benefit of all whom they may concern—such is our aim, the very reason of our being. And I venture to assert that the Society has succeeded in its object. If any be inclined to doubt, I refer him to the thirty volumes of our *Transactions*, to the *Record of Proceedings* at our more than 600 meetings, as proof of our activity and of the unfailing ardour with which the Society has now for half a century devoted itself to the diffusion of entomological science. I can only regret that by the irony of fate it has fallen to *my* lot to fill the presidential chair on this occasion, when, of all others, it ought to have been occupied by one of the fathers of British entomology. But you have willed it otherwise, and I will bury my regret; nay, it is already swallowed up in the delight I feel at the commission with which I have been intrusted by the unanimous voice of the Council, and I am sure that the proposition I have now to make will meet with your approval, and be carried by acclamation. I have to suggest that Prof. Westwood be made titular Life-President of the Society. There is no man to whom we as a body owe so much. An Original Member, he has never failed us; during the crucial period of our childhood he was the motive power, the life and soul of the Society; for fourteen consecutive years he was Secretary, and for part of that time he was Curator also. The Council has seldom been complete without him; he has been vice-president times without number, and during six years (1851–52, 72–73, 76–77) he was our president. Whilst he resided in or near London he rarely missed one of our meetings; even Oxford cannot keep him away from us; and there is not a single year from first to last that he has not been a contributor to our *Transactions*. From 1827 to the present time his pen and his pencil have never been idle; his papers are scattered broadcast over the scientific publications of this and other countries. Scientific bodies, both at home and abroad, have delighted to do him honour. I do not propose to abdicate the function with which your kindness has invested me. But if it be your pleasure to adopt the suggestion that has been made, I shall be proud to recognise Prof. Westwood as my titular chief, and to yield the chair to him at any of our scientific meetings when we are favoured with his presence. I know no better way of showing that our constancy is equal to his, and that our gratitude is enduring and lifelong. It is a barren title and an empty honour, but it is all that we as a Society can bestow. He has grown gray in our service, and in recognition of his

services, to us in particular and to our science in general, I ask you to confer upon him a title which will be a standing record of the esteem in which we hold him, and which throughout the evening of his days shall assure him of our affectionate respect." The proposal was carried by acclamation, and Prof. Westwood was declared honorary life-pre ident of the Society.

Anthropological Institute, May 22.—Mr. Hyde Clarke, vice-president, in the chair.—Mr. G. P. Rathbone exhibited and described a collection of ethnological objects from Bolivia. —Major H. W. Feilden read a paper on stone implements from South Africa. The specimens exhibited form part of a collection made by the author in Natal, the Transvaal, and Zululand during the years 1881 and 1882. Out of the large number of worked stones and implements that have passed through the author's hands he had seen scarcely any with water-worn edges. It would appear, therefore, that these implements, chiefly made of comparatively soft materials, must have been used and lost in the immediate vicinity where they are now found, and the large numbers found in certain spots seem to indicate settlements on stations at such spots; moreover, the most prolific spots are generally just those which would be most advantageous for procuring game. On the summit range of the Drakensberg and in its rocky kloofs, where game must always have been scarce, stone implements are scarce, if not altogether absent, whilst on the lower levels of the Newcastle district, which even in the memory of middle-aged colonists swarmed with countless herds of antelope, we find abundant traces of the Stone period. The conclusion at which the author arrived was that the users of the stone implements found in the more recent of the superficial alluviums were not separated from the present day by any great lapse of time. On several occasions crystals of quartz were found in company with stone implements in the alluviums, and the author believed that the Stone age people had carried these crystals either as charms or ornaments. Possibly the Stone age existed for a lengthened term in South Africa, and may resolve itself into Palæolithic and Neolithic periods, but at present we have hardly sufficient data at command to enable us to arrive at definite conclusions.—The Rev. C. T. Price read a paper by the Rev. James Sibree on relics of the sign and gesture language among the Malagasy.

Institution of Civil Engineers, May 22.—Mr. Brunlees, president, in the chair. The first paper read was on the Edinburgh Waterworks, by Mr. Alexander Leslie, M.Inst.C.E.—The second paper read was on the waterworks of Port Elizabeth, South Africa, by Mr. J. G. Gamble, M.A., M.Inst.C.E.—The third paper was on the water-supply of Peterborough, by Mr. John Addy, M.Inst.C.E.

PARIS

Academy of Sciences, May 28.—M. E. Blanchard, president, in the chair.—The following papers were read:—General considerations on scientific methods with special reference to the *a posteriori* method of Newton and the *a priori* of Leibnitz, by M. E. Chevreul. The author concludes that the experimental inductive method, as practised by Newton and his successors, is unquestionably the cause of the progress of the physico-chemical sciences, while the absolute *a priori* method, as conceived by Leibnitz, barred the way to all further progress. While Newton sought the proximate cause in order gradually to ascend to a possible first cause, Leibnitz started from the first cause, which for him was everything. The study of the material world accessible to the senses led, according to the German philosopher, to nothing real, while the spiritual world, without parts or dimensions, as represented by monads, numerical unities endowed from their creation with motion, was the object of pure knowledge, that is, of God Himself.—An account of the meteorological station of Aigoual in the Cevennes, where an observatory for the systematic study of atmospheric phenomena is about to be erected, by F. Perrier.—Remarks on the violet sulphate of iridium in the heated state, due apparently to oxidation, by M. Lecoq de Boisbaudran. —On the physical and chemical constitution of the vine-growing lands treated by the method of submersion in the lower Rhone valley and Languedoc, by M. P. de Gasparin.—Experimental researches on the action of various alcohols applied slowly and continuously to the pig, by MM. Dujardin-Beaumetz and Audigé. The alcohols invariably produced sleep, prostration, lassitude, while absinthe gave rise to phenomena of excitation somewhat analogous to epilepsy. During the experiments, begun in June, 1879, and concluded in July, 1882, some of the animals died from the effects of the alcoholic poison, and others were sacrificed in order to study its action on the vital functions. This was in all cases found to be injurious.—Observations on the great comet of September, 1882, made at the Paris Observatory, by M. G. Bigourdan.—On the relations existing between the covariants and invariants of the binary form of the sixth order, by C. Stephanos.—On the relations existing between solar eclipses and terrestrial magnetism, by P. Denza.—Note on the hydrates of baryta, by H. Lescœur.—Constituents of the Montrond (Loire) mineral water, by M. Terreil.—On some combinations peculiar to the kreatine and kreatinine groups of substances, by E. Duvillier.—On the fermentation of bread-stuffs, by M. Chicandard. —On some features in the structure of the placenta of the rabbit, by M. Laulanié.—On the origin of the follicular cells and of the ovula in Ascidians and other animals, by M. H. Fol. The author considers that these cells are genetically the strict homologues of the spermatoblasts in zoosperms, while the ovula itself corresponds to the polyblast or male ovula of Duval.—On the formation of the cystoliths and their reabsorption in plants, by M. Chareyre.—On the shingle, sand, and mud formations along the beach of geological seas, by M. Stan. Meunier.—Fresh observations on the dimorphism of the foraminifera, with four illustrations, by MM. Munier-Chalmas and Schlumberger.—On a saccharine substance extracted from the lungs and phlegm of consumptive patients, by M. A. G. Pouchet.—On condiments, especially salt and vinegar, studied from the point of view of their influence on the digestion, by C. Husson. The author's experiments confirm the conclusions of Wurtz, Dumas, Béclard, Claude Bernard, and others, that taken moderately these condiments are useful, especially in stimulating the formation of the gastric juice. In excess they render the food more indigestible, and are irritating to the coats of the stomach. The proportion of salt should not exceed 5 or 10 grams to 0·5 kilograms of meat; of acids 1 to 4 per 1000.

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